



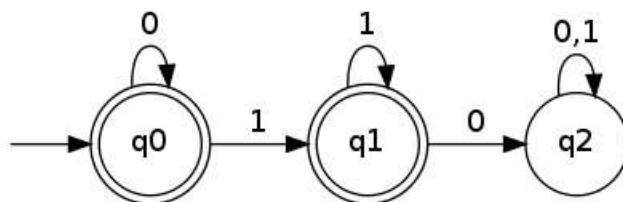
- Construct NDF automata for the following regular expressions. Show the sequence of moves made by each in processing the input string **ababbab**.
 - $(a|b)^*$
 - $(a^*|b^*)^*$
 - $((\epsilon|a)b^*)^*$
 - $(a|b)^*abb(a|b)^*$
- Construct regular expression corresponding to the following finite automata.
- Convert the NFA's in problem 3 into DFA's. Show the sequence of moves made by each in processing the input string **ababbab**.
- Give an NFA with 4 states which accepts the language (01, 011, 0111). Use the subset construction to obtain an equivalent DFA.
- We can prove that two regular expressions are equivalent by showing that their minimum-state DFA's are the same, except for the state names. Using this technique, show that the following regular expressions are all equivalent.
 - $(a|b)^*$
 - $(a^*|b^*)^*$
 - $((\epsilon|a)b^*)^*$
- Consider the regular expression below which can be used as part of a specification of the definition of exponents in floating-point numbers. Assume that the alphabet consists of numeric digits ('0' through '9') and alphanumeric characters ('a' through 'z' and 'A' through 'Z') with the addition of a selected small set of punctuation and special characters (say in this example only the characters '+' and '-' are relevant). Also, in this representation of regular expressions the character '.' denotes concatenation.

$$\text{Exponent} = (+ | - | \epsilon) . (E | e) . (\text{digit})^+$$

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For this regular expression answer the following questions:

- Derive an NFA capable of recognizing this language.
 - Derive the DFA for the NFA that you derive in a.
- Consider the following deterministic finite automata over the alphabet $\Sigma = \{0,1\}$.



- Give a one-sentence description of the language recognized by the DFA.
- Write a regular expression for this language.

Best wishes

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